

PROCEEDINGS  
OF THE  
BIOLOGICAL SOCIETY OF WASHINGTONNOTES ON GARGAPHIA TILIAE WALSH, THE LINDEN  
LACE-BUG.

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The following notes are the results of observations made during the summers of 1918 and 1919 at Uhlerstown, Pa., where the lace-bug *Gargaphia tiliae* Walsh was fairly abundant on lindens growing along the canal.

During the last of May and first of June adults appear and deposit eggs. The adult feeding at this time is quite scattered and shows as numerous white spots on the upper leaf surfaces. The eggs are inserted in the lower leaf surface and occur in clusters of from 60 or less to 300. Their bases are inserted in the tissue and the eggs project at right angles to the lower surface although many lean in all directions. The upper leaf surface just above the egg mass is usually discolored and brown.

After hatching the whitish or brownish-white nymphs feed in compact clusters on the lower leaf surfaces which results in discolored, light, somewhat circular areas on the upper surfaces. Later these areas become brown and dead. The feeding takes place on any part of the leaf and does not appear to be confined to tissue more or less near the midrib as is the case with several species of *Corythucha*. The nymphs are always found feeding in groups and do not scatter as they become older.

During the incubation period of the egg, a female lace-bug is always in attendance and each colony of nymphs usually has a female watching over it until the members are full grown. Fink<sup>1</sup> has observed a similar occurrence in connection with the eggplant lace-bug, *Gargaphia solani* Heid., and states that "when migrating from one leaf to another the female adult usually directs the way and with her long antennae keeps the nymphs together or rebukes any straggler or deserter." Unfortunately, no migrations of *G. tiliae* were observed, but it is quite probable that the adult acts in a similar way.

The eggs require about a week for hatching and the combined nymphal stages about three weeks, making a month from egg to adult. Adults of the

<sup>1</sup> Fink, D. E., The Eggplant Lace-Bug, Bul. 239, U. S. Dept. Agric. Bur. Ent.

first brood appear during the last of June and first part of July after which eggs are again laid, the adults of this second generation hibernating and appearing the following spring.

*Gargaphia tiliae* was described in 1864 by Walsh. Van Duzee in his Catalogue of Hemiptera gives the following references to the species:

Walsh, Proc. Ent. Soc. Phil. III, p. 408, 1864.

Uhler, Check list, p. 22, 1886.

Provancher, Pet. Faune Ent. Can. III, p. 159, 1887.

Bergroth, Revue d'Ent. XI, p. 264, 1892.

Van Duzee, Bul. Buf. Soc. Nat. Sci. V, p. 181, 1894.

Gillette & Baker, Hemip. Colo. p. 57, 1895.

Bueno, Jl. N. Y. Ent. Soc. XVIII, p. 31, 1910.

Smith, Cat. Ins. N. J. ed., 3, p. 149, 1910.

Osborn & Drake, Ohio St. Univ. Bul. XX, p. 234, 1916.

syn. *fasciata* Stal. Enum. Hemip. III, p. 125, 1873.

Wirtner, Ann. Carn. Mus. III, p. 202, 1904.

Smith, Cat. Ins. N. J. ed. 3, p. 149, 1910.

Localities, N. Y., N. J., Pa., Va., Ohio, Ill., Kan., Colo.

To the above references to the species can be added the following:

Drake, Ent. News, XXVIII, p. 227, 1917.

Parshley, Fauna New Eng. Hem. Heter., Bost. Soc. Nat. His. VII, 14, p. 56, 1917.

This latter reference adds New Hampshire, Massachusetts and Connecticut to the list of localities.

*Egg.* Length 0.48 mm. Width 0.18 mm. Suboval, one side more convex than other; basal part acute with rounded end, slightly constricted where inserted in leaf tissue; widest across basal half; extremity of apical end truncate with rim-like collar and central cone-shaped nipple projecting only slightly or not at all; translucent except for apical third which is covered with a light brown varnish-like material.

*First Stage Nymph.* Length 0.45 mm. Elliptical; whitish except articulations of antennal segments, dorsal surfaces of thorax and abdomen, and outer surfaces of legs which are light brown (some specimens are almost entirely white); antennae two-thirds length of body bearing stiff hairs; eyes lateral, consisting of five, distinct, red ommatidia; head, thorax and abdomen bearing minute, dorsal tubercles each tipped with a hair; legs long; rostrum brownish at tip, extending beyond bases of third pair of legs.

*Second Stage Nymph.* Length 0.75 mm. Similar to preceding stage in color, shape and markings; some specimens are entirely light brown; antennae almost three-fourths length of body; tubercles becoming spine-like and similar in arrangement to those of third stage nymph.

*Third Stage Nymph.* Length 1.25 mm. Antennae two-thirds to three-fourths length of body; body oval; antennae, dorsal surfaces of head and thorax, and median, dorsal portion of abdomen tinged with brown, remainder white (some specimens whitish except for last antennal segment and spines on head, thorax and median, dorsal portion of abdomen which are brown; articulation of femur and tibia and tip of tarsus brownish; spines on

head, pro- and mesothorax and median, dorsal portion of abdomen mostly dark, remainder of spines whitish; antennae and legs bearing stiff hairs; rostrum extending slightly beyond bases of third pair of legs. Head bears a pair of separated spines just above and between antennae, behind this pair is a single, larger, median spine; posterior to this one and close to anterior margin of prothorax is a pair of large, separated spines. Prothorax bears a pair of median, separated spines and one spine and several spine-like hairs on each lateral edge. Mesothorax bears a pair of median, dorsal, separated spines, and one spine and several spine-like hairs on each lateral edge. Metathorax bears a dorsal, median pair of smaller, separated spines and a minute one on each lateral edge. Median, dorsal, separated pairs of spines on first and second and single, median, dorsal spines on fifth, sixth and eighth abdominal segments. Lateral margins of each abdominal segment beginning with the second bear a single spine. Head, thoracic and median abdominal spines largest; all spines arise from tuberculate bases and bear one or two hairs at tip and several at sides. Wing pads indicated by slight enlargements of lateral, thoracic margins.

*Fourth Stage Nymph.* Length 1.4 mm. Oval; color and markings similar to those of fifth stage. Antennae as long as body. Lobes of pro- and mesothorax more pronounced. Lobes of mesothorax rounded and reaching second abdominal segment. Rostrum extending to just beyond bases of second pair of legs. Armature similar to that of third stage except for the following additions,—anterior to large spine on lateral edge of prothorax are several minute spines; anterior to large spine on lateral edge of mesothorax are several minute spines and hairs. Anterior to median, dorsal pair on prothorax and close to anterior edge of prothorax is a pair of minute spines with united bases.

*Fifth Stage Nymph.* Length 2.1 mm. Elongate-oval; eyes prominent, lateral, reddish; antennae almost as long as body, first segment two and one-half times as long as second, third segment longest, fourth somewhat swollen. Wing pads extending to sixth abdominal segment. Rostrum extending to between bases of second pair of legs. Base of rostrum bears spine-like hairs. Head bears a pair of separated spines just above and between antennae, a single, median spine posterior to this pair and a pair of separated spines posterior to this one and close to anterior edge of prothorax. Prothorax bears pair small, median spines with united bases just posterior to anterior edge; posterior to this pair is a prominent, median separated pair; posterior, lateral edge bears a prominent spine with a smaller spine and several hairs anterior to it. Mesothorax bears a pair of prominent, median spines separated by the posterior part of the prothorax which is produced triangularly. Wing pad of mesothorax bears a large spine on posterior, lateral edge; anterior to this spine are two smaller spines and several hairs. Metathorax bears dorsal, median pair of separated spines. Separated, median spines on dorsal surface of first and second abdominal segments. Single, median, dorsal spines on abdominal segments five, six and eight. Lateral edges of abdominal segments beginning with fourth bear single spines. Lateral spines on last abdominal segment are short and blunt. All spines arising from tuberculate bases and bearing one or two hairs at tip

and several on sides. COLOR.—First and second antennal segments whitish or tinged with brown, distal third of third segment light, remainder of third and all of fourth segment brown. Head light except that portion lateral to the posterior pair of spines which is dark brown. Prothorax whitish except for posterior half of dorsal surface which is brownish, this dark area is bisected by a broad, median, light stripe. Two central dark areas on mesothorax on either side of a narrow, median light line broadening at its posterior end. Posterior edges of mesothoracic wing pads dark, remainder white. Median, dorsal, portion of abdominal segments three to nine, varying from light to dark brown (seventh segment sometimes white), remainder whitish. Spines on head dark. Pair dark spines arising from median light stripe on prothorax. Prominent spines on posterior lateral edges of prothoracic expansions dark, other prothoracic spines light. All large spines on mesothorax and mesothoracic wing pads dark, others light. Median dorsal spines on fifth, sixth, eighth and lateral spines on ninth abdominal segments light brown to dark brown, remaining abdominal spines whitish. Ventral surface whitish, except base and tip of rostrum and articulation of femur and tibia and tip of tarsus which are brownish.